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DEPARTMENT OF COMMERCE

International Trade Administration

W.M. Keck Observatory, et al.

Notice of Consolidated Decision on Applications

for Duty-Free Entry of Scientific Instruments

This is a decision pursuant to Section 6(c) of the Educational, Scientific, and Cultural Materials Importation Act of 1966 (Pub. L. 89-651, as amended by Pub. L. 106-36; 80 Stat. 897; 15 CFR part 301). Related records can be viewed between 8:30 A.M. and 5:00 P.M. in Room 3720, U.S. Department of Commerce, 14th and Constitution Ave, NW, Washington, D.C.

Comments: None received. Decision: Approved. We know of no instruments of equivalent scientific value to the foreign instruments described below, for such purposes as each is intended to be used, that was being manufactured in the United States at the time of its order.

Docket Number: 14-030. Applicant: W.M. Keck Observatory, Kamuela, HI 96743. Instrument: Next Generation Adaptive Optics (NGAO) Laser System. Manufacturer: Toptica Photonics AG, Germany. Intended Use: See notice at 80 FR 31890, June 4, 2015. Comments: None received. Decision: Approved. We know of no instruments of equivalent scientific value to the foreign instruments described below, for such purposes as this is intended to be used, that was being manufactured in the United States at the time of order. Reasons: The instrument will be used to provide a high quality "artificial star" in the atmosphere to remove the image blurring caused by the atmosphere, as part of a Laser Guide Star Adaptive Optics System. The system uses a technique called Adaptive Optics that measures the turbulence in Earth's atmosphere that causes blurring or "twinkling" by "flexing" or "bending" a deformable mirror at speeds of hundreds of times per second. The instrument is used to excite sodium atoms residing in the mesosphere above the Earth's surface creating an "artificial star" for measuring the atmosphere's turbulence. The instrument uses a laser of a precise wavelength of 589nm projected onto the sodium layer at 90km in the atmosphere, for which the stability, format

and bandwidth are critical. The wavelength, amount of power, and spectral content required to resonant atoms 90km in the atmosphere are not commonly used in the laser industry.

Docket Number: 15-003. Applicant: University of California Santa Barbara, Santa Barbara, CA 93106-6105. Instrument: Cryo Positioning Stage High Resonance. Manufacturer: Janssen Precision Engineering, the Netherlands. Intended Use: See notice at 80 FR 31890, June 4, 2015. Comments: None received. Decision: Approved. We know of no instruments of equivalent scientific value to the foreign instruments described below, for such purposes as this is intended to be used, that was being manufactured in the United States at the time of order. Reasons: The instrument will be used to construct a variable temperature (4-300 Kelvin) scanning probe microscope with sub-nanometer stability, optical access and microwave integration to measure nitrogen vacancy probes. There is no domestic instrument that combines six degrees of freedom of linear motion in a tool that operates at cryogenic temperatures (<4 Kelvin) and has a resonant frequency larger than 1 kHz.

Docket Number: 15-013. Applicant: Washington State University, Pullman, WA 99164-1020. Instrument: CTK Reactor, High Pressure Reactor, Diff pump mass spectrometer. Manufacturer: OmniVac, Germany. Intended Use: See notice at 80 FR 31890-91, June 4, 2015. Comments: None received. Decision: Approved. We know of no instruments of equivalent scientific value to the foreign instruments described below, for such purposes as this is intended to be used, that was being manufactured in the United States at the time of order. Reasons: The instrument will be used to take measurements during an ongoing catalytic reaction, i.e. under 'operando' reaction conditions so as to clarify mechanistic details during studies up to 100 bar so as to ensure optimal conditions for the production of fuels and other chemical feedstock such as detergents or lubricants. Such dynamic reaction studies will help elucidate the mechanisms of catalytic reactions such as the formation of transportation fuels from 'synthesis gas' (Fischer Tropsch synthesis). While CTK informs about the early run-in period in a time-resolved manner, the high pressure reactor allows the study of steady-state reaction behavior at a bench scale for many

hours. The Quantachrome system allows measurements of the specific surfaces areas of materials, which is required for the optimization of catalysts. The CTK reactor comprises a gas cleaning and dosing system, along with gas inlets using mass flow controllers. The central part of the reactor is made of quartz, and temperatures can be varied at choice. The high pressure reactor comprises gas cleaning and inlet pressure up to 100 bar, surrounded by a temperature programmed oven which allows temperatures of up to 500 Celsius. The differential mass spectrometer serves to continuously control gas phase compositions and is equipped with a high-speed turbo molecular pump and rotary forevacuum pump. Sampling occurs with calibrated capillary at pressures controlled by ion gauges. The Quantachrome system allows specific surface areas to be determined using non-selective probe molecule adsorption at cryogenic temperatures.

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